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# TRANSLATOR'S VERIFICATION

I, Philip M. Morris, a translator residing at P.O. Box 670907, Dallas, Texas 75367 verify that I know well both the German and the English languages, that I have prepared the attached English translation of a PCT patent application in the German language entitled "Agent for Repelling and Inactivating Pathogenic Organisms of Plants" identified by Patent Co-Operation Treaty reference number PCT/EP99/07151 and international publication number WO 00/27192 and that the attached English translation of this document is a true and correct translation of the documents attached thereto to the best of my knowledge and belief.

I further declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 USC 1001, and that such false statements may jeopardize the validity of this document.

Date: March 1, 2001 By: Philip M. Morris

# AGENTS FOR REPELLING AND INACTIVATING PATHOGENIC ORGANISMS OF PLANTS

Every year, truck farms, meristem operations and plant cultivators sustain great damage due to organisms [germs] that infect sets [plantlets], young plants, mother plans and seeds, destroying them or rendering them useless. If, for example, viruses enter a cultivation, it can be assumed that 100 % of the plants will be damaged. The only option open to the truck farms then is the radical measure of destroying the entire culture.

Specifically active agents are commercially available with which a few phytopathogens can be combated without influencing the vitality of the plant. These agents, designated as pesticides, are systemically effective but usually have only a narrow spectrum of activity.

On the other hand, a significantly broader spectrum of activity is offered by common disinfecting agents based on aldehydes, phenols, halogens, peroxides and quaternary ammonium compounds. If these "surface disinfecting agents" get on the plant or are directly applied to the plant, this always entails irreversible damage to the plant. This means that such disinfecting agents can only be used on working surfaces, positioning surfaces and devices such as, e.g., knives and the like. The surfaces must be freed thereafter from adhering remnants of active substances in order not to endanger the plants during subsequent working steps.

However, a sufficient inactivation is not even assured on surfaces since these agents always exhibit significant gaps in their activity against phytopathogenic organisms.

DE OS 32 27 126 and DE OS 32 29 097 teach that certain combinations of anionic surfactants, aliphatic and aromatic carboxylic acids as well as a few heteroaromatic acids are capable of comprehensively killing off or inactivating viruses, bacteria and fungi without gaps in their activity.

The microbes tested according to the above-cited Offenlegungsschriften and patents were primarily human-pathogenic organisms with a low infectiousness like those recommended as test microbes by, among others, the German Society for Hygiene and Microbiology (DGHM) and the German Society for Veterinary Medicine (DVG).

The application of the teaching to highly infectious and resistant phytopathogenic organisms displayed a microbicidal and virus-inactivating activity that was just as persevering as had already been shown to be the case with the human-pathogenic test germs.

However, further tests for plant compatibility with the same agents regularly resulted in a damaging of the test plants in the form of severe scorching, so that the use on plants appeared to be excluded.

It was surprisingly found that the use of certain acid combinations and surfactant combinations in the presence of glycols overcomes the previous deficiency in the combating of phytopathogenic organisms and that when applied directly onto a plant they retain a pronounced bactericidal, fungicidal

and viricidal activity and do not damage the plant cells (roots, stems, leaves, flowers and fruit) in the application concentration.

The present invention has as subject matter agents for treating plants and their environment with the goal of killing off phytopathogenic bacteria, fungi, viruses and viroids and to hinder their spread. Even pathogens that are already on plants can be killed off or inactivated (viruses) by these agents by moistening roots, stems, leaves and flowers without damaging the plant cells. The biological behavior of the plant is also not altered by the treatment. Working areas in the vicinity of the plants (e.g., tables, knives, positioning surfaces) that could cause a contamination are also freed in a persevering [lasting] manner of noxious organisms therewith without phytotoxic residues having to be subsequently removed.



Examples for formulating the agents according to the patent claim[s]

The following examples are intended to explain the patent claim[s] without limiting them.

Example 1)

| Components | Parts by weight (%) |
|---|---|
| Alkylarylsulfonate potassium | 8.50 % by wt. |

| | |
|---|---|
| Propane diol-1,2 | 20.50 |
| Toluene sulfonate potassium | 10.00 |
| p-Hydroxybenzoic acid | 6.90 |
| Hydroxyethanoic acid | 3.80 |
| Propanol-2 | 28.00 |
| Water (desalinated) | 18.50 |

Example 2)

| | |
|---|---|
| Alkylsulfonate potassium | 10.00 % by wt. |
| Ethane diol-1,2 | 15.00 |
| Cumene [cumol] sulfonate potassium | 10.00 |
| p-Hydroxybenzoic acid | 6.90 |
| Oxoethanoic acid | 7.00 |
| Propanol-1 | 15.00 |
| Propanol-2 | 15.00 |
| Water (desalinated) | 18.50 |

Example 3)

| | |
|---|---|
| Alkylarylsulfonate potassium | 12.00 % by wt. |
| Ethane diol-1,2 | 18.00 |
| Cumene [cumol] sulfonate potassium | 8.00 |

| | |
|---|---|
| Benzoic acid | 7.00 |
| 2-Hydroxypropionic acid | 7.00 |
| Propanol-1 | 20.00 |
| Propanol-2 | 15.00 |
| Water (desalinated) | 13.00 |

Example 4)

| Components | Parts by weight (%) |
|---|---|
| Alkylsulfonate (C8-C18) potassium | 7.00 % by wt. |
| Alkylsulfonate (C12) potassium | 3.00 |
| Ethane diol-1,2 | 12.00 |
| Cumene [cumol] sulfonate potassium | 11.50 |
| Benzoic acid | 9.00 |
| 2-Hydroxyethanoic acid | 4.50 |
| Propanol-1 | 15.00 |
| Propanol-2 | 15.00 |
| Water (desalinated) | 23.00 |

Example 5)

| | |
|---|---|
| Alkylarylsulfonate sodium | 12.00 % by wt. |
| Cumene [cumol] sulfonate sodium | 8.50 |

| | |
|---|---|
| o-Hydroxybenzoic acid | 9.50 |
| 2-Hydroxypropionic acid | 5.00 |
| Propanol-1 | 22.00 |
| Propanol-2 | 20.00 |
| Water (desalinated) | 23.50 |

Bactericidal activity on the plant (biotest)

A. Young plant pelargoniums and begonias were contaminated by spraying with Xanthomonas campestris. A leaf surface of 1 $cm^2$ had $10^4$ KBE after the contamination.

A treatment with example 4 in concentrations of 1.0 %, 2.0 % and 3.0 % took place, also with a spraying method, one hour after the inoculation.

Specimens were taken one hour after the treatment. The germs of the treated and of the untreated controls (without example 4) were removed from the leaves by ultrasound (wash liquid of 0 °C) and their number determined.

B. Pelargoniums and begonias were treated by spraying with example 4.

The contamination with Xanthomonas campestris took place, also with a spraying method, 24 hours after the treatment with example 4.

Specimens were taken one hour after the contamination. The germs of the treated and of the untreated controls (without example 4) were removed

from the leaves by ultrasound (wash liquid of 0 °C) and their number determined.

Scorching, lesions on the leaf edges and the leaf blades, germ reduction and leaf compatibility are cited in the following table:

| | | Pelargoniums | | Begonias | |
|---|---|---|---|---|---|
| A | Concentration | Germ reduction | Toxic phenomena on leaves | Germ reduction | Toxic phenomena on leaves |
| | 1.0% example 4 | 97%;93% | No lesions | <99% | No lesions |
| | 2.0% example 4 | 100%;99.5 % | No lesions | 99.9% | No lesions |
| | 3.0% example 4 | 100%;99.9 % | A few leaf edge lesions | 99.9% | Slight lesions on leaf edges |
| | 1.0% example 5 | 98%;95% | Lesions on the leaf edges | 99.5%; 99.7% | Lesions on the leaf edges and leaf blades |
| | 2.0% example 5 | 100%;100 % | Lesions on the leaf edges and leaf blades | 99.9%;99.9 % | Scorching on the leaf edges and the leaf blades |
| | 3.0% example 5 | 100%;94% | Many lesions on the leaf edges and leaf blades | 100%;100% | Scorching on the leaf edges and the leaf blades |
| B | 1.0% example 4 | 98% | No lesions | 95% | No lesions |

Plant compatibility

Maximal tolerable concentrations of formulation examples 2, 4 and 5 on plant organs

[numerical and sign data require no translation]

| **Examples** | **Plant organ** | **Phalaenopsis**[1] **Damage** **Lesions** **BR** **BS** |
|---|---|---|
| 1.0 % example 2 | Flowers | 0 |
| | | |
| | | |
| | Leaves | |
| | | |
| | | |
| | | |
| | Flowers | |
| | | |
| | | |
| | Leaves | |
| | | |
| | | |
| | | |
| | Flowers | |
| | | |

| | | |
|---|---|---|
| | | |
| | Leaves | |
| | | |
| | | |

Lesion. = Lesions

+++ = very many / very heavily damaged

++ = very / heavily damaged

\+ = few / slightly damaged

0 = none / not damaged

BR = leaf edges

BS = leaf blades

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[1] orchid type

The test for a sufficient inactivation of phytopathogenic organisms resulted in the following results:

1. Bactericidal action of examples 1 – 5 in a lab test according to "Guideline 16-4 for the Testing of Plant Protection Products for Disinfection in the Cultivation of Decorative Plants" of the Biological Federal Institute for Agriculture and Forestry (Braunschweig, 1986)

Required contact times of examples 1 – 5 for killing off the indicated bacterial strains

| Examples | Xanthomonas pelargonii | Pseudomonas solanaceum | Erwinia amylovora |
|---|---|---|---|
| Tap water control | No activity | No activity | No activity |
| 1.0% example 1 | 1 min. | | |
| [see p. 8 for rest | of data] | | |
| | | | |
| | | | |
| | | | |

2. Fungicidal action of examples 1 – 5 in a lab test according to "Guideline 16-4 for the Testing of Plant Protection Products for Disinfection in the Cultivation of Decorative Plants" of the Biological Federal Institute for Agriculture and Forestry (Braunschweig, 1986)

Required contact times of examples 1 – 5 for killing off the indicated fungus test strains

| Example | Fusarium oxysporum | Thielaviopsis basicola | Phythophtora sp | Cylindrocladium scoparium |
|---|---|---|---|---|
| Tap water control | No activity | No activity | No activity | No activity |
| 1.0% example 1 | 16 h | > 16 h | 1 h | > 16 h |
| [see p. 8 for rest | of data] | | | |
| | | | | |
| | | | | |
| | | | | |

Required contact times of examples 1 – 5 for inactivating the indicated viral strains (suspension test)

| Disinfecting agent | TMV | PBY | PFBV | CNV | ORSV | PSTVd |
|---|---|---|---|---|---|---|
| Tap water control | No activity | No activity | No activity | No activity | No activity | No activity |
| 1.0% example 1<br>2.0% example 1<br>3.0% example 1 | 16 h | 16h | 4 h | 16 h | 4 h | 4 h |
| | | | | | | |
| [see page 9 for | rest of | data] | | | | |
| | | | | | | |
| | | | | | | |

TMV = Tobacco mosaic virus

PVY = Potato virus Y Potyvirus

PFBV = Pelargonium flower break carmovirus

CNV = Cucumber necrosis tombuvirus

ORSV = Odontoglossum ringspot virus

PSTVd = Potato spindle tuber viroid

[page 10 duplicates the top half of page 8 of the original down to the bottom of the graph (page 11, bottom, and page 12, top, above)]